REPORT ON CANCER INCIDENCE: CLAREMONT NH RESIDENTS, 1987-2001

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Executive Summary

In response to recent inquiries, the NH Department of Environmental Services (DES) and the Department of Health and Human Services (DHHS) conducted a review of cancer incidence in the city of Claremont. Cancer rates for the 1987-2001 period were calculated for 24 major cancer types taking into account the age and gender composition of the population. Claremont cancer statistics were compared with those of the State as a whole.

Cancer incidence data for 1987-2001 were provided by the NH State Cancer Registry. Data were analyzed with the Standardized Incidence Ratio (SIR) technique, which is used to investigate disease incidence in small areas, and is the first step in NH's disease cluster investigation protocol. The purpose of the SIR is to identify unusually high (or low) disease rates in an area and determine whether or not they are amenable to public health intervention.

Results of the analysis revealed no unusually high cancer incidence in Claremont for the 1987-2001 period. None of the 24 major cancer types for Claremont exhibited statistically significant elevations compared with the State as a whole.

Analysis of Claremont cancer trends over time revealed an improvement in overall cancer compared to the State from 1987-1991 to 1997-2001. Breast cancer incidence was significantly lower for Claremont than for the State in the five-year period 1997-2001. No other site-specific cancers differed significantly from those of the State.

Background

Claremont is a city of 13,344 (2004 US Census estimate) located along the Connecticut River in Sullivan County in the western part of NH. It is the largest incorporated place in Sullivan County, and ranks 19th in population size among cities and towns in NH. Claremont is the location of the County's only acute care facility, Valley Regional Hospital, which is also the city's largest employer.

Methods

Data Sources

Cancer became a reportable disease in New Hampshire in 1985, and since 1986 the New Hampshire State Cancer Registry (NHSCR) has been charged with identifying all new cases of cancer occurring among New Hampshire residents. Health Statistics and Data Management (HSDM), under the New Hampshire Department of Health and Human Services (DHHS) has overall responsibility for the NHSCR, which it funds through a state contract. Dartmouth College has continuously held the contract to operate the NHSCR since its inception. The registry is administratively located in the Norris Cotton Cancer Center. The US Centers for Disease Control and Prevention (CDC) currently provides a grant to DHHS, and these funds have been used to help increase the scope of registry information and to assure the quality of the data collected. Cancer data is collected in accordance with NH Administrative Rules. HSDM receives the cancer data set from the NHSCR. NHSCR currently collects reports from hospital registrars operating in all the large hospitals in NH. Hospitals with relatively smaller caseloads

of cancer (fewer than 100 cases per year) generally do not have their own cancer registry, so NHSCR staff assists these hospitals with their reporting duties. NHSCR also receives reports of cases from physician practices, freestanding radiation oncology centers, out-of-state pathology laboratories and other sources, as required by NH Administrative Rules. In addition, the NHSCR receives reports for NH residents who are diagnosed outside of NH, based on agreements of information exchange with other states.

The time period 1987-2001 was selected for evaluation of cancer incidence data because it was the most recent data available, and because multiple years of data are needed to provide large enough numbers to yield meaningful statistics for smaller areas such as individual cities or towns. An incident case was defined as an individual residing within the city of Claremont who was diagnosed with a new primary malignant cancer during the evaluation period. The variables analyzed included: city/town of residence at time of diagnosis, primary cancer type, date of diagnosis, age at diagnosis, and sex. Information on other risk factors, such as health-related behaviors, environmental and occupational exposures, or access to medical care, is not available in the abstracted medical data used in this review.

Population estimates for 1987-2001 were calculated by combining the 1990 and 2000 US Census enumerations for the city of Claremont and for the State of New Hampshire.

Data Analysis

A descriptive epidemiological analysis of cancer incidence for the city of Claremont was conducted using the Standardized Incidence Ratio (SIR) technique. The SIR is used to analyze disease incidence in small areas, and is the first step in NH's disease cluster investigation protocol. The SIR compares the actual (observed) number of cancer cases in the study population (residents of Claremont) to the number that would be expected to occur if Claremont had the same age- and sex-specific cancer rates as the State of NH. An SIR is the ratio of the observed number of cases to the "expected" number of cases in the study population. These ratios were calculated for all 24 major cancer types.

The purpose of an SIR study is to identify unusually high (or low) disease rates in an area. Once identified, an assessment is made as to whether the disease in question might be amenable to public health intervention. It is important to emphasize that the term "expected" as used in this study is based only on the characteristics of age and gender. It does not take into account other determinants of disease rates such as health-related behaviors (e.g., tobacco and alcohol use, diet), environmental or occupational exposures, or access to health care (e.g., insurance status, other financial and personal barriers).

As a whole, the population of NH is among the healthiest and lowest risk in the nation. The population of Claremont is at somewhat higher socioeconomic risk than the State as a whole, which can result in barriers to health care access and utilization, as well as in riskier health-related behaviors. This factor must be taken into account when interpreting the SIR.

The SIR tells us how much higher or lower Claremont cancer rates are than those of the comparison population (State of New Hampshire) based on age and sex. If the observed number of cases is the same as the age-sex expected number, the SIR will equal 1. If there are more

observed cases than would be expected, then the SIR will be greater than 1. If there are fewer observed cases than expected, the SIR will be less than 1. For example, if 10 cases are observed in the study population, but 5 cases were expected, then the SIR = 10/5 = 2.0 and the area has twice number of cancer cases as expected. But if 20 cases were expected, then the SIR = 10/20 = 0.5, meaning that the area has half the expected number.

Caution should be exercised when interpreting the SIR. The interpretation must take into account the actual number of cases observed and expected, not just the ratio. Two SIRs can have the same ratio, but represent very different scenarios. For example, a SIR of 1.5 could mean 3 cases were observed and 2 were expected (3/2 = 1.5). Or it could mean 300 cases were observed and 200 were expected (300/200 = 1.5). In the first instance, only 1 "excess" cancer case occurred, which would most likely have been due to chance. But, in the second instance, 100 excess cancers occurred, which would most likely not be a chance occurrence. This elevated ratio would then be investigated further to determine if it can be linked to any known cause or set of causes.

To help interpret the SIR, the statistical significance of the difference between state and local disease rates is calculated. In other words, the number of observed cases can be determined to be significantly different from the age-sex expected number of cases or the difference can be due to chance alone. "Statistical significance" for this review means that there is less than 5 percent chance (p-value <0.05) that the observed difference is merely the result of random fluctuation in the number of observed cancer cases. If the SIR is found to be statistically significant, then the difference between the expected and observed cases is probably due to some set of factors that influences the rate of that disease.

New Hampshire's average annual age-sex specific cancer incidence rates were used to derive the expected number of cancer cases for Claremont. SIRs were calculated for each cancer type and reported when 5 cases or more were observed among Claremont residents within the reporting period. Cells with between one and four cases are suppressed at the town level in accordance with the HSDM data release policy.

Results

Table 1 presents cancer incidence statistics based on the SIR analysis for the city of Claremont. The data are presented for each of the 24 major cancer types. Statistics include:

1) **Observed** number of cancer cases in Claremont for the 1987-2001 period;
2) **Expected** number of cases based on the State age-sex average;
3) Ratio of Observed-to-Expected cases (**SIR**) for each cancer type; and
4) 95% **confidence intervals** for each SIR.

There were no statistically significant elevations in cancer rates for the city of Claremont for the 1987-2001 period. The SIR of 1.02 for "TOTAL" cancer indicates that Claremont had about 2% more cancer cases than "expected" over the 15-year period. This "excess" is most likely due to chance fluctuation.

Separating the 1987-2001 period into three 5-year groups reveals a favorable trend in overall cancer rates for Claremont compared to the State as a whole (Tables 2a-2c). In 1987-1991, Claremont had seven percent more cancer cases than expected (SIR=1.07), while in 1997-2001 it had 6% **fewer** than expected (SIR=0.94).

Of the 100 separate ratios calculated for this analysis, none of the Claremont observed number of cancers was significantly higher than expected. Only breast cancer for Claremont women was significantly lower than the age-sex expected.

Conclusions

- A standardized incidence ratio (SIR) analysis for the city of Claremont for the years 1987-2001 found that cancer rates for 24 major cancer types were all within their expected ranges based on corresponding rates for the state as a whole.

- Analysis of trends over that fifteen-year period revealed a substantial improvement in total cancer rate for Claremont from 1987-1991 to 1997-2001. During the 1997-2001 period, the only cancer type whose observed number of cases was significantly different from the expected was female breast cancer. There were 23% **fewer** breast cancers than expected among Claremont females during this period (44 Observed, 57 Expected).

Resources

Community members can find more information on cancer and cancer prevention by contacting the following organizations:

NH Health Statistics and Data Management (http://www.dhhs.state.nh.us/DHHS/HSDM)

NH State Cancer Registry (http://www.dartmouth.edu/~nhscr/)

National Cancer Institute (http://cancernet.nci.nih.gov)

American Cancer Society (www.cancer.org)
800-ACS-2345

Division of Cancer Prevention and Control
Centers of Disease Control and Prevention (http://www.cdc.gov/cancer)
888-842-6355

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Table 1. Cancer incidence by site, Claremont residents, 1987-2001					
Cancer Site	Observed Number	Age-Sex Expected Number	SIR (Obs/Exp)	95% CI Lower	95%CI Upper
Bladder	67	62	1.07	0.82	1.37
Brain & other CNS	13	11	1.21	0.60	2.18
Breast (female)	164	168	0.98	0.83	1.13
Cervical	13	11	1.21	0.60	2.18
Colorectal	146	145	1.00	0.85	1.18
Esophagus	13	12	1.07	0.55	1.86
Hodgkins Disease	5	7	0.74	0.29	1.53
Kidney & Renal Pelvis	25	23	1.10	0.69	1.65
Larynx	16	13	1.25	0.66	2.15
Leukemia	26	24	1.07	0.69	1.59
Liver	*	7	*	*	*
Lung & Bronchus	176	165	1.07	0.91	1.24
Melanoma of the Skin	28	35	0.80	0.55	1.11
Multiple Myeloma	17	12	1.45	0.74	2.54
Non-Hodgkins Lymphoma	42	39	1.07	0.76	1.46
Oral Cavity & Pharynx	20	26	0.77	0.50	1.13
Other	76	77	0.98	0.78	1.23
Ovary	24	21	1.13	0.70	1.73
Pancreas	32	25	1.32	0.84	1.92
Prostate	152	152	1.00	0.85	1.17
Stomach	22	17	1.32	0.76	2.13
Testis	*	6	*	*	*
Thyroid	8	9	0.89	0.41	1.69
Uterine	33	32	1.05	0.71	1.48
TOTAL	1128	1105	1.02	0.96	1.08

Expected numbers have been rounded to whole numbers for presentation only.

***Numbers suppressed in cancer sites with between 1 and 4 observed cases**

Table 2a. Cancer incidence by site, Claremont residents, 1987-1991					
Cancer Site	Observed Number	Age-Sex Expected Number	SIR (Obs/Exp)	95% Cl Lower	95%Cl Upper
Bladder	23	21	1.10	0.68	1.67
Brain & other CNS	*	5	*	*	*
Breast (female)	62	56	1.10	0.83	1.43
Cervical	7	4	1.57	0.46	3.85
Colorectal	63	52	1.22	0.91	1.61
Esophagus	8	4	1.99	0.54	5.10
Hodgkins Disease	*	3	*	*	*
Kidney & Renal Pelvis	7	7	1.00	0.40	2.07
Larynx	*	5	*	*	*
Leukemia	7	7	0.99	0.40	2.04
Liver	*	7	*	*	*
Lung & Bronchus	52	54	0.96	0.72	1.25
Melanoma of the Skin	8	9	0.89	0.41	1.69
Multiple Myeloma	5	4	1.35	0.34	3.57
Non-Hodgkins Lymphoma	9	12	0.75	0.39	1.30
Oral Cavity & Pharynx	10	10	1.00	0.48	1.83
Other	23	27	0.87	0.57	1.27
Ovary	7	7	0.96	0.39	1.95
Pancreas	7	8	0.89	0.38	1.76
Prostate	52	41	1.27	0.91	1.72
Stomach	8	6	1.33	0.49	2.89
Testis	*	2	*	*	*
Thyroid	*	2	*	*	*
Uterine	9	10	0.90	0.43	1.65
TOTAL	384	358	1.07	0.96	1.19

Expected numbers have been rounded to whole numbers for presentation only.
***Numbers suppressed in cancer sites with between 1 and 4 observed cases**

Table 2b. Cancer incidence by site, Claremont residents, 1992-1996					
Cancer Site	Observed Number	Age-Sex Expected Number	SIR (Obs/Exp)	95% Cl Lower	95%Cl Upper
Bladder	22	21	1.04	0.64	1.59
Brain & other CNS	6	5	1.10	0.38	2.47
Breast (female)	58	54	1.07	0.80	1.39
Cervical	*	3	*	*	*
Colorectal	39	49	0.79	0.59	1.39
Esophagus	*	4	*	*	*
Hodgkins Disease	*	2	*	*	*
Kidney & Renal Pelvis	9	8	1.16	0.49	2.32
Larynx	9	4	2.04	0.60	5.02
Leukemia	11	8	1.35	0.59	2.65
Liver	*	2	*	*	*
Lung & Bronchus	61	54	1.12	0.84	1.46
Melanoma of the Skin	8	11	0.73	0.36	1.31
Multiple Myeloma	6	4	1.57	0.41	4.10
Non-Hodgkins Lymphoma	18	13	1.42	0.75	2.44
Oral Cavity & Pharynx	*	8	*	*	*
Other	27	24	1.12	0.72	1.67
Ovary	6	8	0.79	0.33	1.59
Pancreas	15	8	1.98	0.83	3.97
Prostate	57	57	1.00	0.76	1.30
Stomach	6	6	1.06	0.37	2.34
Testis	*	2	*	*	*
Thyroid	*	3	*	*	*
Uterine	14	10	1.39	0.67	2.56
TOTAL	389	369	1.05	0.95	1.17

Expected numbers have been rounded to whole numbers for presentation only.

***Numbers suppressed in cancer sites with between 1 and 4 observed cases**

Table 2c. Cancer incidence by site, Claremont residents, 1997-2001					
Cancer Site	Observed Number	Age-Sex Expected Number	SIR (Obs/Exp)	95% CI Lower	95%CI Upper
Bladder	22	20	1.08	0.66	1.66
Brain & other CNS	*	5	*	*	*
Breast (female)	44	57	0.77	0.58	0.997
Cervical	*	3	*	*	*
Colorectal	44	45	0.97	0.71	1.30
Esophagus	*	4	*	*	*
Hodgkins Disease	*	2	*	*	*
Kidney & Renal Pelvis	9	8	1.12	0.48	2.19
Larynx	*	4	*	*	*
Leukemia	8	9	0.90	0.41	1.72
Liver	*	3	*	*	*
Lung & Bronchus	63	56	1.12	0.85	1.46
Melanoma of the Skin	12	15	0.82	0.45	1.35
Multiple Myeloma	6	4	1.44	0.40	3.65
Non-Hodgkins Lymphoma	15	14	1.04	0.57	1.72
Oral Cavity & Pharynx	*	8	*	*	*
Other	26	27	0.97	0.64	1.42
Ovary	11	6	1.71	0.65	3.62
Pancreas	10	9	1.09	0.50	2.06
Prostate	43	53	0.82	0.61	1.07
Stomach	8	5	1.57	0.51	3.65
Testis	*	2	*	*	*
Thyroid	*	4	*	*	*
Uterine	10	11	0.88	0.44	1.56
TOTAL	355	376	0.94	0.85	1.04

Expected numbers have been rounded to whole numbers for presentation only.

***Numbers suppressed in cancer sites with between 1 and 4 observed cases**